

12 direction, such that said photo mask develops a diffraction pattern of said optical
13 image during said optical transmission; and,
14 reducing optics to reduce and focus said diffraction pattern on said substrate wafer.

REMARKS

Applicant appreciates the thorough search conducted by the Examiner in examining the above-identified application. Applicant has endeavored to amend the application in a sincere effort to overcome the objections and rejections, and reconsideration is requested in view of the amendments above and the remarks below.

35 U.S.C. § 112 Issues

The Examiner has rejected claims 1-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, in claims 1 and 7 the terms "the optical transmission" and "the contrast" were said to lack antecedent bases. Applicant respectfully submits that these corrections were corrected in the 9 February 2000 amendment. Applicant has added the definitive "said" before the term "optical transmission" in claims 1 and 7, lines 10 and 13, respectively, to properly refer back to the optical transmission defined in claim 1, line 1, and in claim 7, line 5. Applicant respectfully submits that claims 1 and 7, as amended, are now placed in a condition for allowance over the 35 U.S.C. § 112, second paragraph, rejection.

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35 U.S.C. § 103 Issues

The Examiner has rejected claims 1, 2, 4, 5, 7-9, 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Chiu (U.S. Patent No. 5,989,752) in view of Tanabe. Applicant submits that the claims, as amended, are patentably distinct over the cited prior art for the reasons stated below.

Chiu teaches and discloses a reconfigurable mask for forming erasable patterns. The patterns are comprised of material having localized optical properties manipulated by non-physical means. Chiu, column 4, lines 21-33. The Chiu invention is distinguished from conventional masks in that the optical properties of individual areas of the mask are separately controlled. "Such an ability is not available with conventional chrome masks." Chiu, column 4, lines 53-54. The object of Chiu's invention is to provide a mask having a pattern that can be altered at will. Chiu, column 2, lines 34-35. In contrast, the instant invention is directed to enhancing the contrast of a lithographic image. Specification, page 5, lines 13-16. The mask of the instant invention is non-reconfigurable, and employs a metal (chromium) film over a layered glass substrate, which is patterned to shield light in predetermined areas. Specification, page 12, lines 3-7. This metal patterned film is opaque to all types of light polarization at all times. The mask of Chiu is not. Applicant has amended claims 1, 7, 17, and 18 to distinctly claim the metal patterned opaque mask.

In order to create the reconfigurable mask of Chiu, two polarizers are required having perpendicular polarization. Chiu, column 5, lines 25-26. The Chiu mask is completely transparent when the liquid crystal (LC) material between the two perpendicular polarizers is non-biased. Chiu, column 5, lines 36-44; Fig. 2A. By biasing the LC, the cell transparency of



the Chiu mask is reduced. When incident light traverses the LC and then reaches the bottom polarizer, the light is met with a polarizer having a perpendicular polarization relative to the top polarizer, which then makes the cell appear opaque. Chiu, column 5, lines 52-55; Fig. 2B. Thus, in order to achieve the effect of an opaque mask pattern, Chiu must manipulate the liquid crystal cells between two perpendicularly fixed polarized layers. Chiu, column 9, lines 16-23. This means the two perpendicularly fixed polarizers of Chiu are fundamental to making the Chiu mask opaque, and not to enhance the lithographic image of the mask. The instant invention relies on an already existing opaque mask, and uses two polarizers, only one of which is fixed, to enhance the contrast of the lithographic image. Thus, applicant has amended claims 1, 7, 17, and 18 to specifically call out using a patterned metal film as the opaque mask. Specification, page 12, lines 3-7. This allows the claimed invention to be patentably distinct over the cited prior art of Chiu. Applicant respectfully submits that these claims, as amended, and those depended therefrom, overcome the 35 U.S.C. § 103(a) rejection.

Moreover, since the Chiu invention requires two perpendicularly fixed polarizers to achieve an opaque mask, the addition of Tanabe would add a third adjustable polarizer to the Chiu mask in order to enhance the contrast of the lithographic image in a manner similar to the instant invention. Simply removing one of the fixed polarizers of the Chiu mask and replacing it with the remote, adjustable polarizer of Tanabe defeats the invention of Chiu, which requires two fixed polarizers perpendicular to each other, to establish a reconfigurable mask, and not to enhance a lithographic image. Additionally, there is no suggestion in either prior art for the combination of a third, adjustable polarizer to the reconfigurable mask of Chiu.

The Examiner further rejects claims 3 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Chiu in view of Tanabe, and further in view of Okamoto. Okamoto discloses a patterned SOG layer for phase shifting, but not for polarizing. Applicant has amended claim 3 to include a SOG layer impregnated with polarizing members for polarizing the transmitted light. For the additional reasons cited above for amended claim 1, applicant also submits that claims 3 and 6 are patentably distinguishable over the cited prior art of Chiu, Tanabe, and Okamoto.

For the reasons given above, applicant respectfully submits that the claims of the instant application are placed in a condition for allowance. Reconsideration of the rejections and allowance of the claims are respectfully solicited. Any matters that may be handled by telephone should be directed to the undersigned at (203) 787-0595.

Respectfully submitted,



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